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Bob Hartzler

Iowa State University, hartzler@iastate.edu

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The Iowa Monarch Conservation Consortium

Bob Hartzler, professor and Extension weed scientist, Agronomy, Iowa State University

The monarch butterfly

Most people are aware of the monarch's migration to overwintering sites in central Mexico. There are about 11 mountain areas west of Mexico City where the monarchs spend the winter (Figure 1). The elevation of these sites range from 8000 to 12,000 ft, with temperatures ranging from 32 to 59 F. The monarchs cluster in trees to retain heat, occasionally branches break due to the weight of the monarchs. The size of the monarch population is estimated by measuring the area of trees covered with adult butterflies.

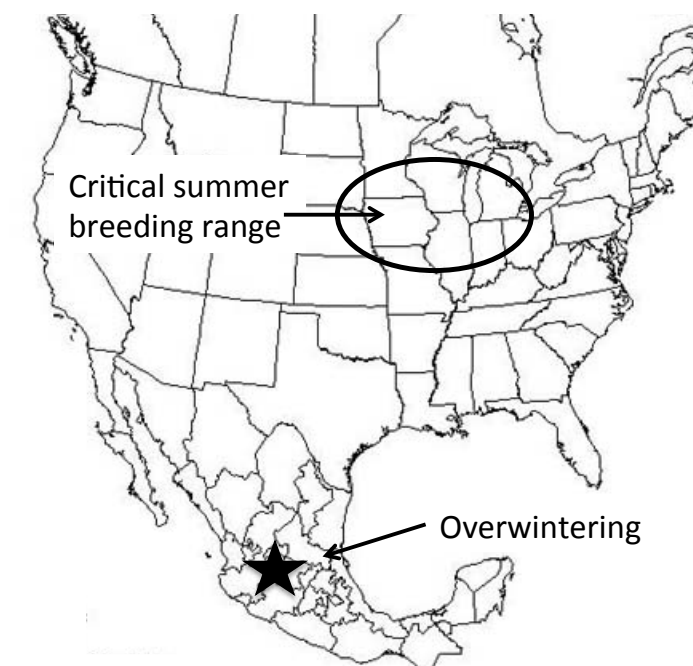


Figure 1. Summer breeding and overwintering sites of the monarch butterfly.

After spending the winter in these mountains, in March the migratory generation begins moving north. These monarchs make it as far as Texas (approximately 500 miles) where they lay eggs and die. The monarchs born in Texas continue the migration north, with monarchs typically arriving in Iowa during May. There are typically three to four generations in the summer breeding range, which extends into Canada and as far east as New England. The final generation begins the migration to Mexico in August. The majority of the migratory population that overwinters in Mexico is born in the Cornbelt (Figure 1). The journey to central Mexico is more than 2000 miles.

Another unique aspect of the monarch butterfly life cycle is its reliance on milkweed. Females will only lay eggs on members of the milkweed family, and the larvae only feed on these plants. Eggs typically require 3-4 days to hatch, and the larvae require about two weeks to pupate (Table 1). There are 17 milkweed species native to Iowa. Common milkweed is the most prevalent and the most important resource to the monarch in Iowa. Other important species in Iowa include swamp, whorled and honeyvine milkweed. Adult monarchs feed on nectar from a wide range of species not limited to milkweeds.

Table 1. Duration of monarch life cycle stages

Stage	Duration
Egg	3 to 4 days
Larva	10-14 days
Pupa	10-14 days
Adult (spring-summer generations)	2 to 5 weeks
Adult (migratory generation)	8 to 9 months

Monarchs at risk

The size of the monarch population is estimated by annual measurements of the area of trees covered by adults at the overwintering sites. There has been a steady decline in adults at these sites over the past twenty years (Figure 2).

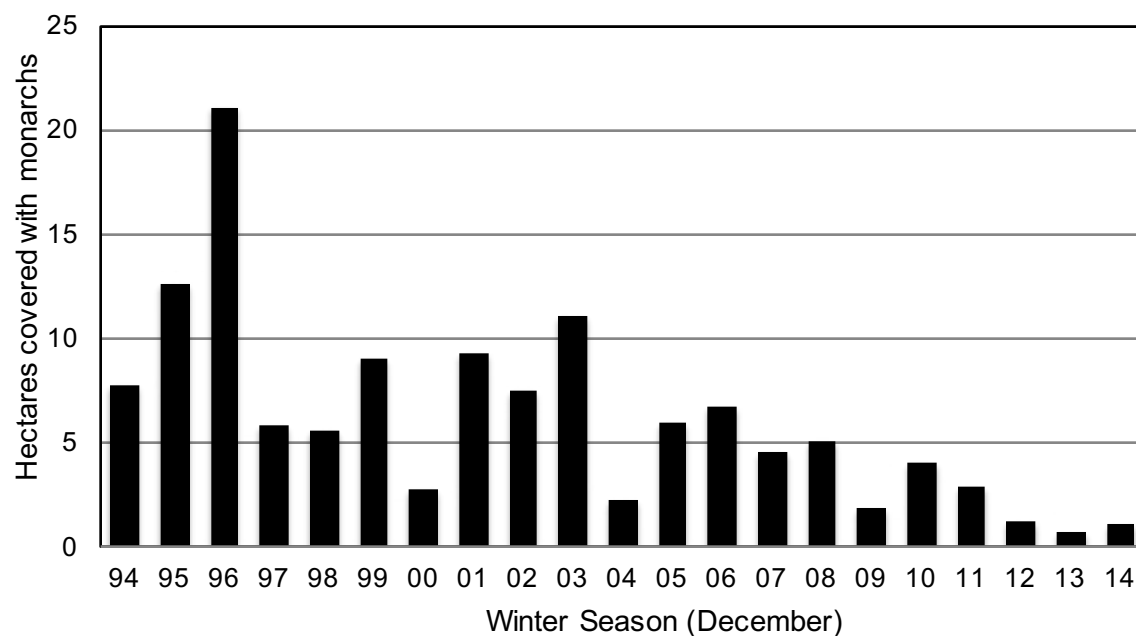


Figure 2. Total area occupied by monarch colonies in Mexico. Source: World Wildlife Fund.

Due to the monarch butterfly's complex life cycle and its large geographical range, it is difficult to pinpoint what factors are most important in the monarch's decline. The monarch is dependent upon the microclimate of a very small region in central Mexico to overwinter. Logging of these mountains has reduced the available area for roosts. As this area decreases, it concentrates the butterflies and increases their vulnerability to storms and other factors that cause losses during overwintering. Sanctuaries have been established and the rate of deforestation has declined.

Monarchs depend on milkweeds for larval growth and development. Changes in crop management practices and a reduction in Conservation Reserve Program (CRP) acres have contributed to the loss of milkweed across much of the summer breeding range. Between 1999 and 2009 there was an 85% reduction in the number of Iowa crop fields with common milkweed present. Widespread use of glyphosate in Roundup Ready crops was the likely cause of this milkweed loss.

The prolonged drought in Texas is likely to have negatively affected the monarch. Adults that overwinter in Mexico move north to Texas where the first generation develops. The severe drought limited availability of milkweed in this region, therefore limiting the size of the population that migrates into Iowa and surrounding summer breeding range. Return of rain in 2015 to this region should be beneficial to monarchs migrating north from Mexico.

Other factors that may have negatively affected the monarch population include the loss of nectar producing plants in the breeding range and migratory route, insecticide use, and weather events. Winter storms in the Mexico mountains can cause large losses in butterflies.

Because of the many vulnerable points in the monarch life cycle, protecting this icon is a difficult task that requires international cooperation. Iowa's location in the center of the summer monarch breeding range makes it critical that the state actively participate in conservation efforts to protect the insect.

The Iowa Monarch Conservation Consortium

The Iowa Monarch Conservation Consortium was established in February 2015 through the efforts of numerous Iowa farmer, livestock producer, commodity and conservation organizations; Iowa State University's College of Agriculture and Life Sciences; the Iowa Department of Agriculture and Land Stewardship and the Iowa Department of Natural Resources.

The Consortium, convened by the College, grew out of discussions that started in the spring of 2014. It establishes a farmer-led, science-based approach to enhancing monarch butterfly reproduction in Iowa through collaborative and coordinated efforts of farmers, private citizens and their organizations. The long-term goal of the consortium is to lead efforts in the recovery of the monarch butterfly without impacting the productivity of Iowa's cropland.

In the fall of 2014 a petition was filed with the U.S. Fish and Wildlife Service to protect the monarch butterfly as a threatened species under the Endangered Species Act. While the Consortium is not taking a position on the petition, it is focused on supporting habitat improvements in underutilized areas in rural landscapes that do not conflict with agricultural production, are sufficient in scale to support improved monarch breeding success, and strive to complement other conservation programs.

The Consortium will take a science-based approach in assisting farmers and communities in enhancing monarch butterfly reproduction. Objectives of the research component include:

1. Develop cost-effective methods to establish and maintain milkweed species and companion flowering plants
2. Determine breeding habitat characteristics that influence the success of monarch reproduction, and
3. Refine survey techniques to assess performance of the conservation program.

The consortium's extension and outreach program will draw upon all of the member organizations to ensure the broad delivery of practical, science-based information on monarch butterfly conservation practices for Iowa's landscapes.